Patent Claims

1. A method for filling material separations at a surface of a substrate or a layer, characterized in that the material separation (4) is filled electrolytically in a first method step, with one or more eddy-current probes (13), which generate oscillations in the region around the material separation (4), being used in the region of the material separation (4).

2. The method as claimed in claim 1, characterized in that the substrate (1) or the layer (1) is electrically connected to an electrode (7), substrate or layer (1) and electrode being arranged in an electrolyte (10), and in that a current between substrate (1) and electrode (7) can be varied over the course of time.

3. The method as claimed in claim 2, characterized in that the current is pulsed.

4. The method as claimed in claim 2 or 3, characterized in that the parameters of the current (maximum current intensity (I_{max}), interpulse period (t_{off}) and pulse duration (t_{on}) and pulse shape (37)) are matched to the electrolyte (10).

5. The method as claimed in claim 2, characterized in that at least one ultrasound probe (19) is operated in the electrolyte (10).

6. The method as claimed in claim 1, characterized in that the frequency (f) of the eddy-current probe (16) is varied during the method.

7. The method as claimed in claim 6, characterized in that the frequency (f) is matched to the depth of the material separation (4).

8. The method as claimed in claim 2, characterized in that the electrolyte (10) includes material of the same type or a similar type to the material of the substrate (1) or the layer (1).

9. The method as claimed in claim 1, characterized in that the material separation (4) is widened in a first method step.

10. The method as claimed in claim 1, characterized in that a current/voltage pulse (40) is used for the electrolytic deposition, with both positive and negative current/voltage pulses (40) being used.

11. The method as claimed in claim 1, characterized in that a plurality of repeated current/voltage pulses (40) which are combined in a sequence (34) are used for the electrolytic deposition, the sequence (34) of at least two different blocks (77) being used, with a block (77) comprising at least one current pulse (40).

12. The method as claimed in claim 11, characterized in that a block (77) is determined by a number of current pulses (40), pulse duration (t_{on}), interpulse period (t_{off}), current intensity (I_{max}) and pulse shape (37).

13. The method as claimed in claim 11, characterized in that a block (77) is in each case matched to a constituent of an alloy, in order to boost the deposition of this constituent of the alloy.

14. The method as claimed in claim 1, characterized in that an alloy of the type MCrAlY is deposited, in which M is an element selected from the group consisting of iron, cobalt or nickel.

15. The method as claimed in claim 11, characterized in that gradients are produced in the material composition within the material separation (4).

16. The method as claimed in claim 3 or 11, characterized in that a base current is superimposed on the current pulses (40) and/or the interpulse periods.

17. An apparatus for filling material separations at a surface of a substrate or a layer, characterized in that the apparatus (40) includes
a vessel (46) containing an electrolyte (10),
a voltage source (25),
at least one electrode (7) and
at least one eddy-current probe (16),
which can be placed on the substrate (1) or layer (1).

18. The apparatus as claimed in claim 17, characterized in that the apparatus (40) has at least one ultrasound probe (19) which is arranged in the electrolyte (10).